I CLAIM:

1. Method of depositing a crystalline α-Al_2O_3-layer onto a cutting tool insert by chemical vapor deposition comprising the following steps:

depositing a from about 0.1 to about 1.5 μm layer of $TiC_xN_yO_z$ where $x+y+z>=1$ and $z>0$;

treating said layer at from about 625 to about 1000 °C in a gas mixture containing from about 0.5 to about 3 vol-% O_2 for a short period of time from about 0.5 to about 4 min; and

depositing said Al_2O_3-layer by bringing said treated layer into contact with a gas mixture containing from about 2 to about 10 vol-% of $AlCl_3$, from about 16 to about 40 vol-% of CO_2, in H_2 and from about 0.8 to about 2 vol-% of a sulphur--containing agent at a process pressure of from about 40 to about 300 mbar and a temperature of from about 625 to about 800 °C.

2. The method of claim 1 wherein

in said depositing a from about 0.1 to about 1.5 μm layer of $TiC_xN_yO_z$, $x+y+z>=1$ and $z>0.2$;

in said treating said layer at from about 625 to about 1000 °C in a gas mixture containing O_2, said O_2 is present as $CO_2 + H_2$ or $O_2 + H_2$ and said treating occurs for a short period of time from about 0.5 to about 4 min; and

in said depositing said Al_2O_3-layer, the temperature is from about 625 to 700 °C.

3. The method of claim 2 wherein the depositing temperature is from about 650 to 695 °C.

4. The method of claim 1 wherein said treating step is also carried out in the presence of from about 0.5 to about 6 vol-% HCl.

5. Cutting tool comprising a body of sintered cemented carbide, cermet, ceramic, high speed steel or the superhard materials and with at least on the functioning parts of the surface of the body, a hard and wear resistant coating comprising at least one layer consisting essentially of crystalline α-Al_2O_3 with a thickness of from about 0.5 to about 10 μm, said crystalline α-Al_2O_3 having columnar grains with an average grain width of from about 0.1 to about 1.1 μm and being deposited by chemical vapor deposition at a temperature of from about 625 to about 800 °C.

6. The cutting tool of claim 5 wherein said body comprises a body of cubic boron nitride or diamond.

7. The cutting tool of claim 5 wherein said coating comprises at least one layer consisting of Ti(C,N) with a thickness of from about 0.5 to about 10 μm deposited between the body and said α-Al_2O_3-layer by the MTCVD technique at a temperature less than 885 °C.

8. The cutting tool according to claim 7 wherein said coating further comprises an intermediate layer of from about 0.5 to about 1.5 μm of $TiC_xN_yO_z$ where x+y+z>=1 and z>0 between the α-Al_2O_3–layer and the MTCVD-TiCN-layer.

9. The cutting tool according to claim 8 wherein in said intermediate layer z>0.2.

10. The cutting tool according to claim 9 wherein in said coating intermediate layer z>0.2, y=0 and x>=0.

11. The cutting tool of claim 5 wherein said coating comprises at least one layer adjacent to the tool body deposited by PVD or PACVD.

12. The cutting tool of claim 11 wherein said coating comprises an intermediate layer of from about 0.1 to about 1.5 μm $TiC_xN_yO_z$ between the α-Al_2O_3 and the PVD or PACVD-layer(s,) where x+y+z>=1 and z>0.

13. The cutting tool of claim 12 wherein in said intermediate layer z>0.2.

14. The cutting tool of claim 13 wherein in said intermediate layer z>0.2, y>=0 and x<0.1.

15. The cutting tool of claim 11 wherein said coating has a pronounced columnar grain structure with a grain width of <0.5 μm.

16. The cutting tool of claim 5 wherein one such α-Al_2O_3 layer is the top visible layer at least along the cutting edge line.

17. The cutting tool of claim 5 wherein the coating on the rake face and along the edge line has been smoothed by brushing or by blasting to a surface roughness, R_a of less than 0.2 μm over a measured length of 5 μm.

18. The cutting tool of claim 5 wherein said tool is a cutting insert, a solid carbide drill or a carbide end-mill.